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Donald et al.

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(54) **TOILET BOWL VENTILATING APPARATUS**

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Related U.S. Application Data

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(30) **Foreign Application Priority Data**

Dec. 31, 1997 (CA) 2226021

(51) **Int. Cl.**[7] **E03D 9/04**
(52) **U.S. Cl.** **4/213**
(58) **Field of Search** 4/213, 216, 217, 4/347–352

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(57) **ABSTRACT**

A toilet bowl ventilating apparatus includes a housing secured in cantilever fashion to a mounting arm which is adapted to be mounted to toilet seat mounting bolts of a toilet bowl. The housing has a receptacle for filter medium and a fan to draw air through the housing past the filter medium. The mounting arm is secured substantially symmetrically at a mid-point of the housing and has an outwardly and downwardly extending elongated intake passage that extends down into the toilet bowl. The intake passage is flexibly adjustable over 180 degrees to a selected orientation, thereby enabling the intake passage to change orientation depending upon whether the housing is positioned on the left side or the right side of the toilet bowl.

7 Claims, 5 Drawing Sheets

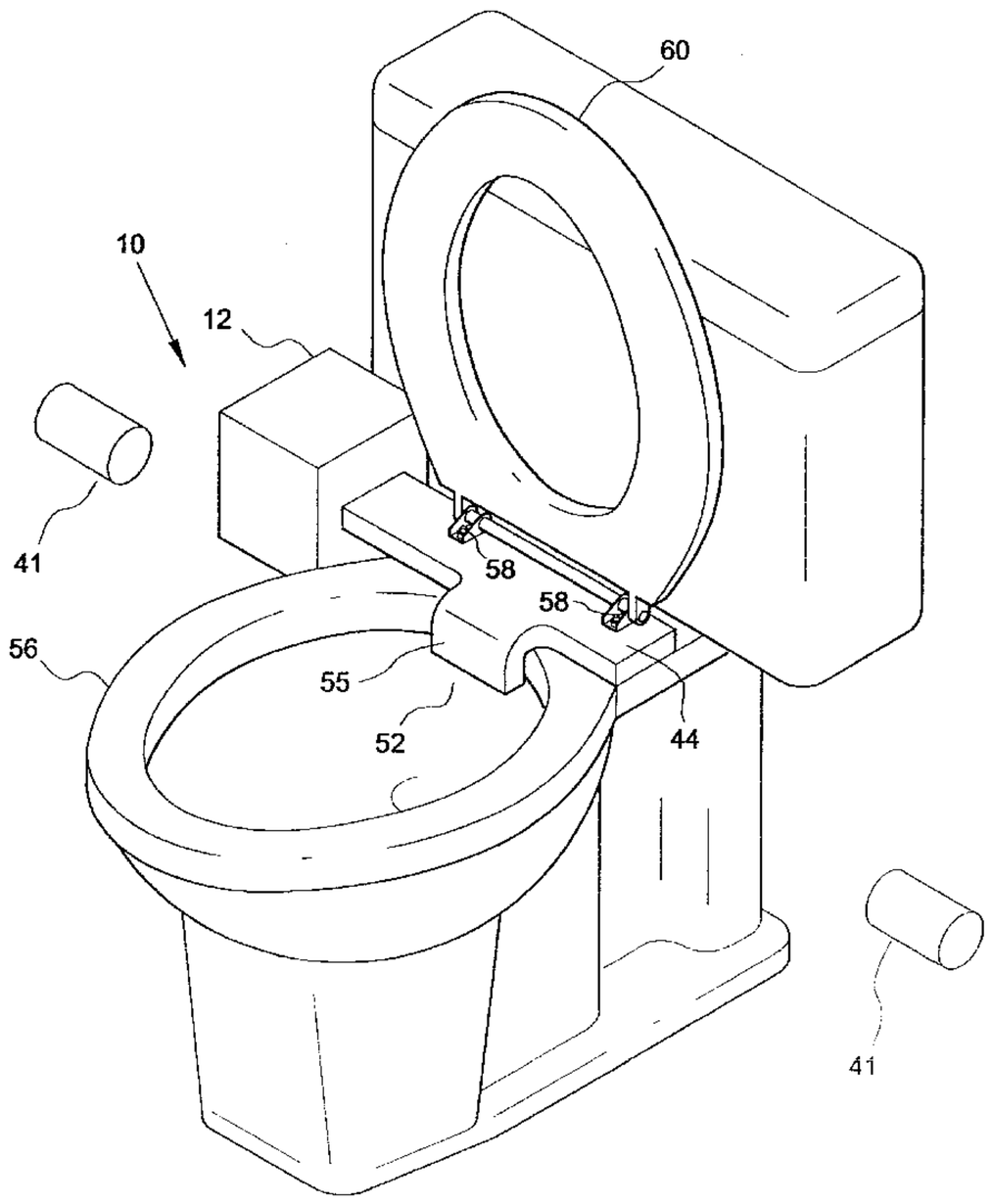

FIG. 1

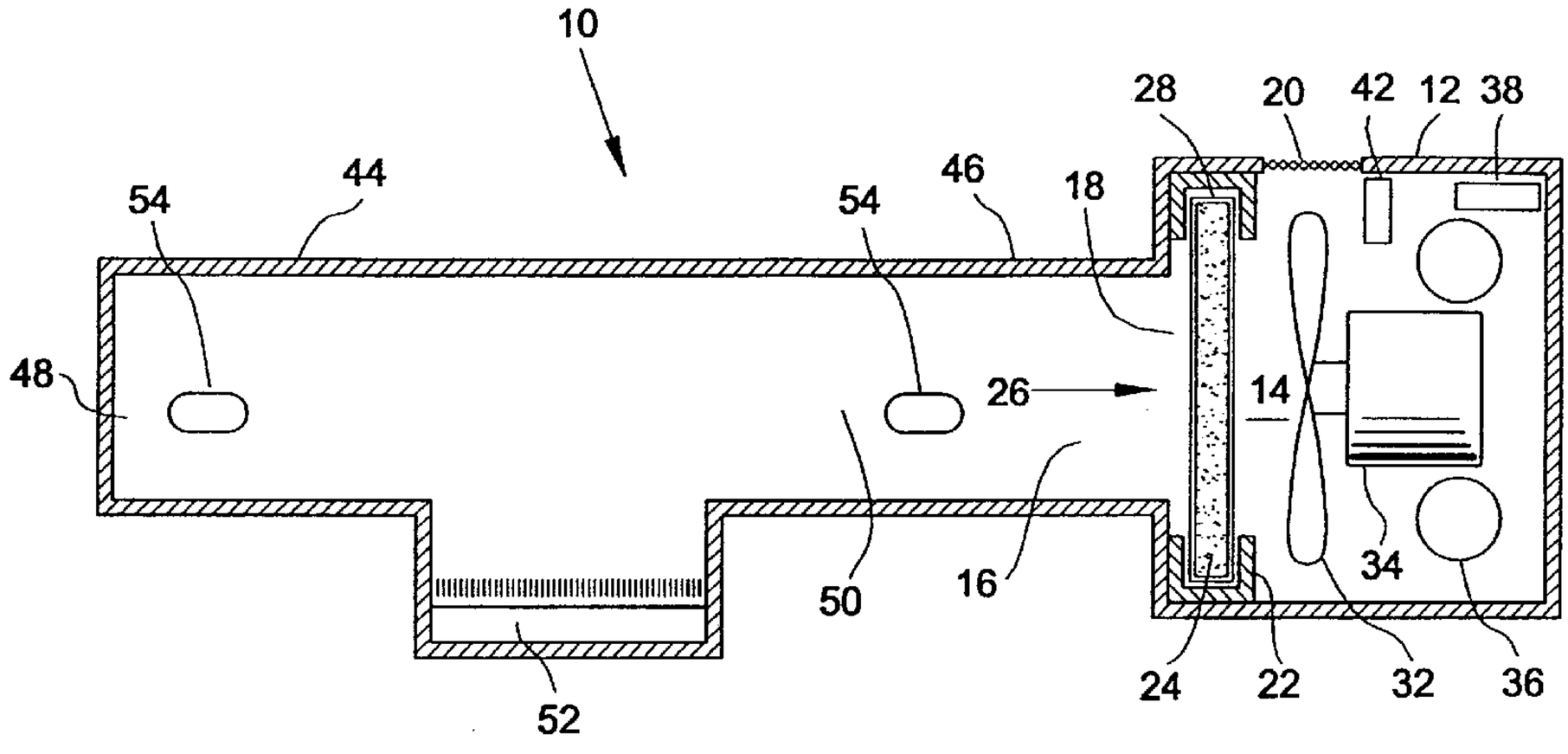
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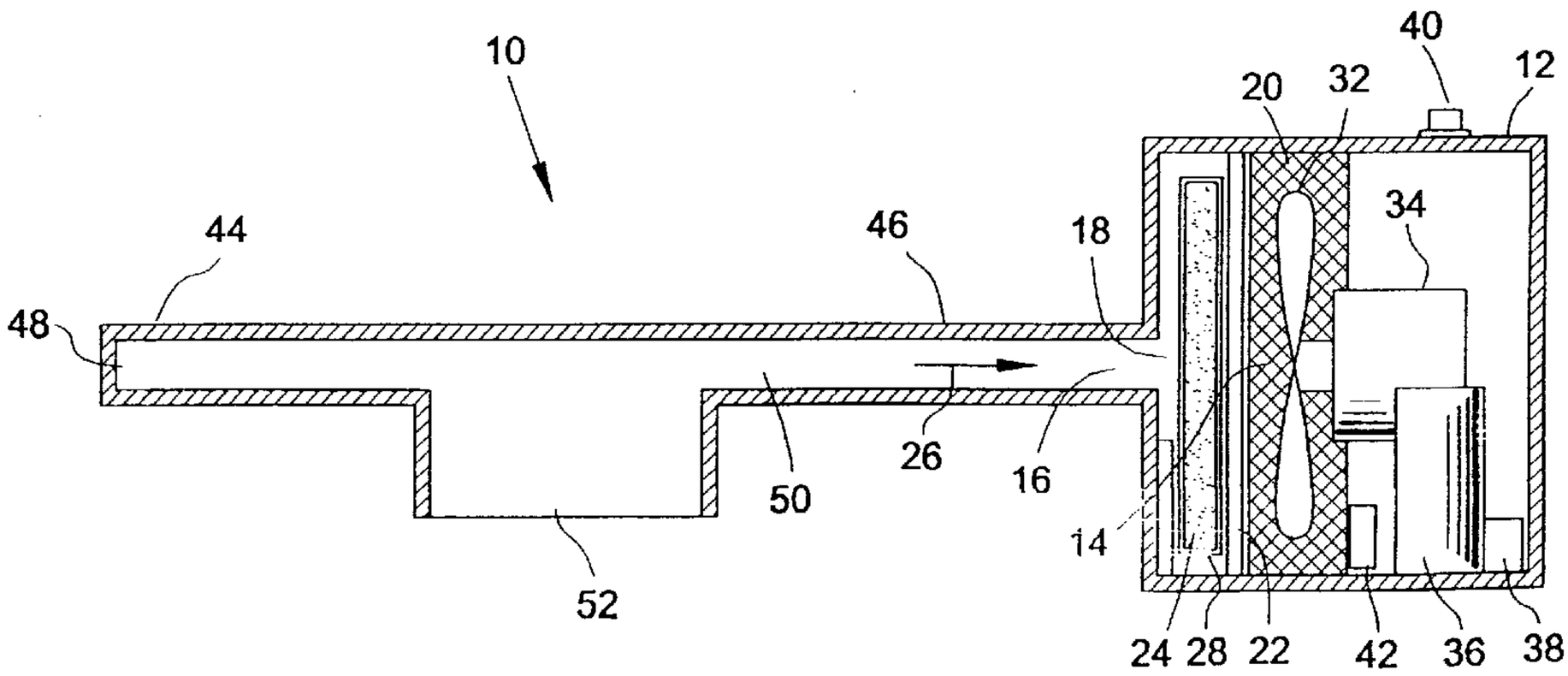
FIG. 2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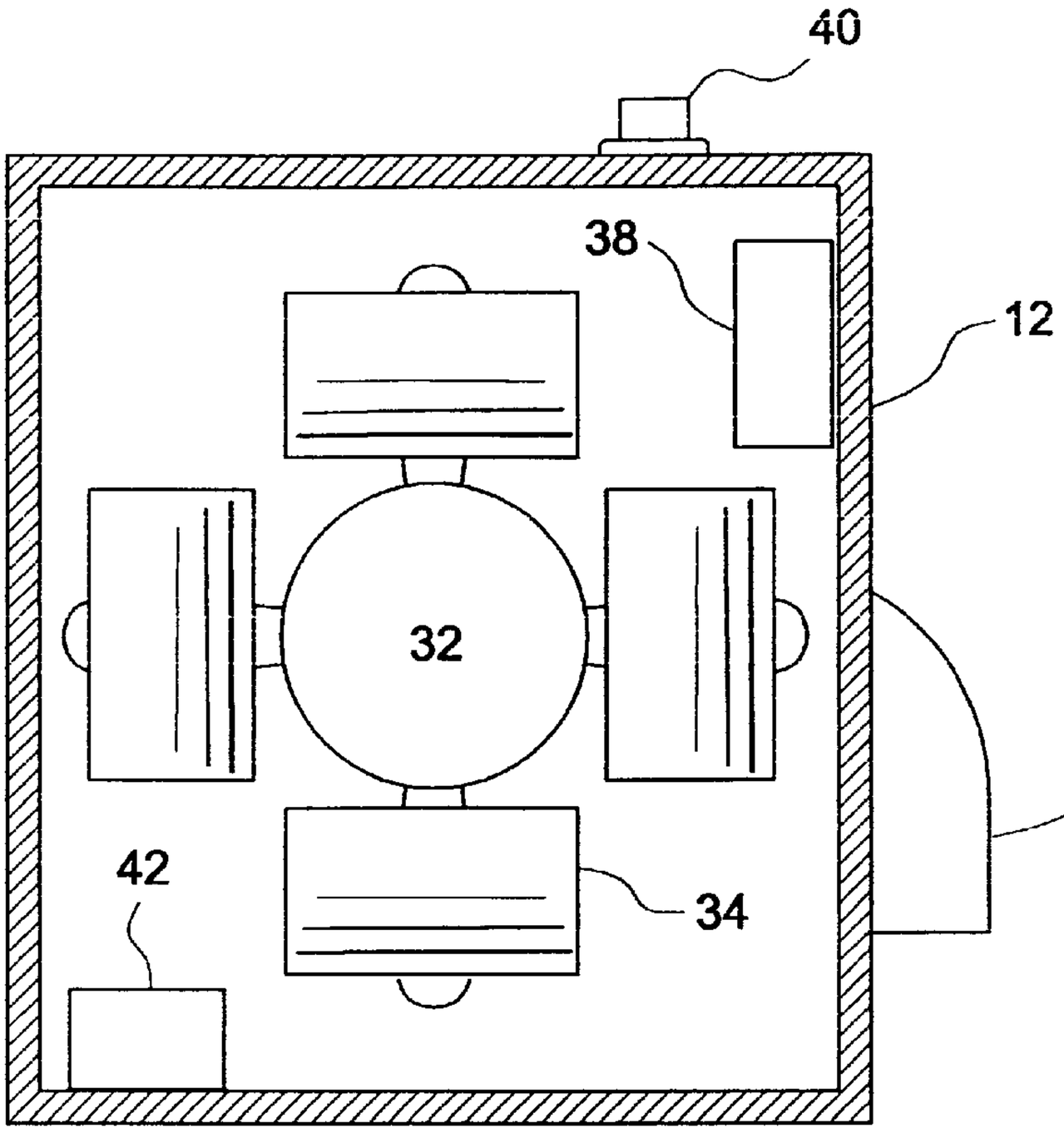


FIG. 3

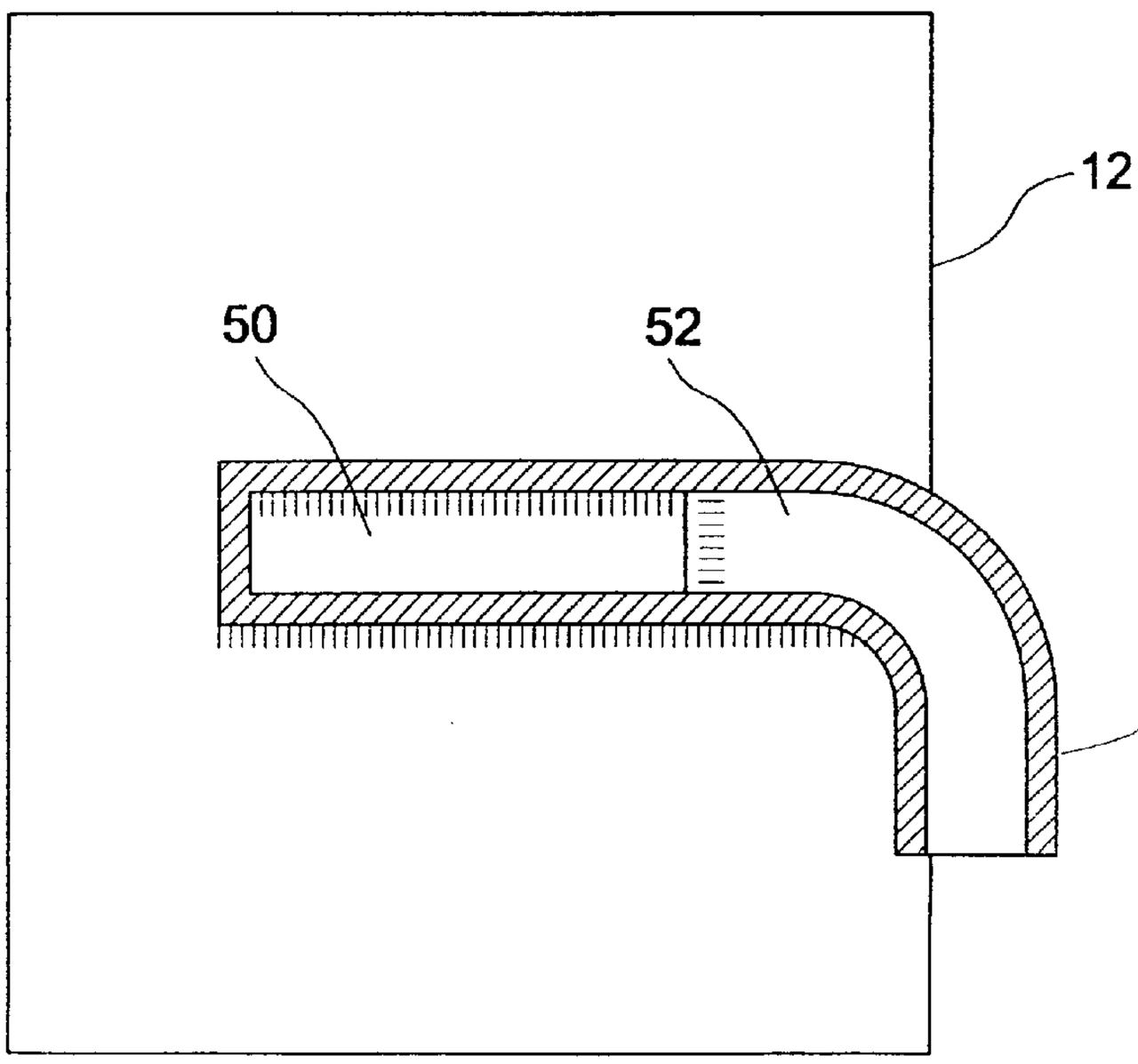


FIG. 4

FIG. 5

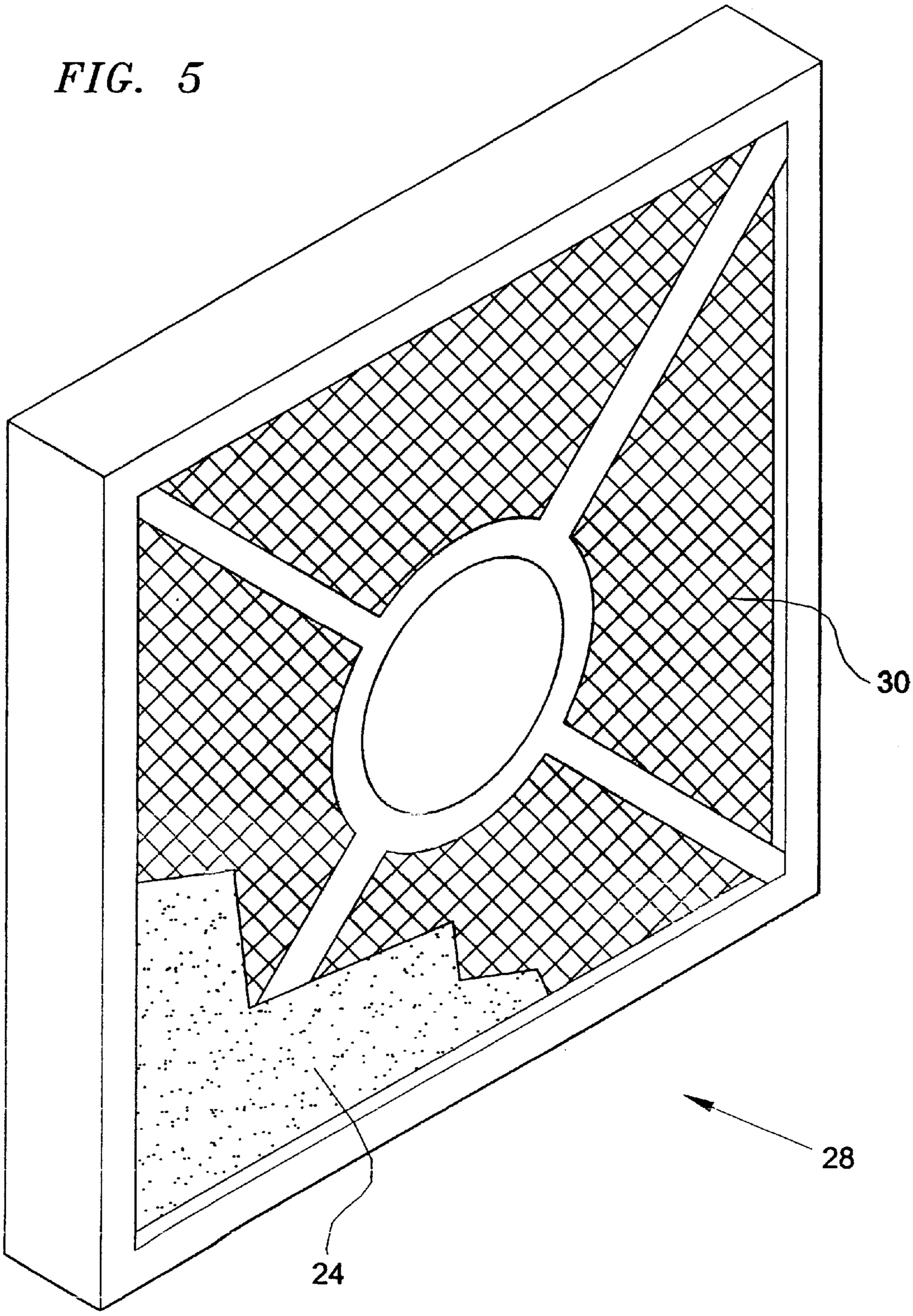


FIG. 6

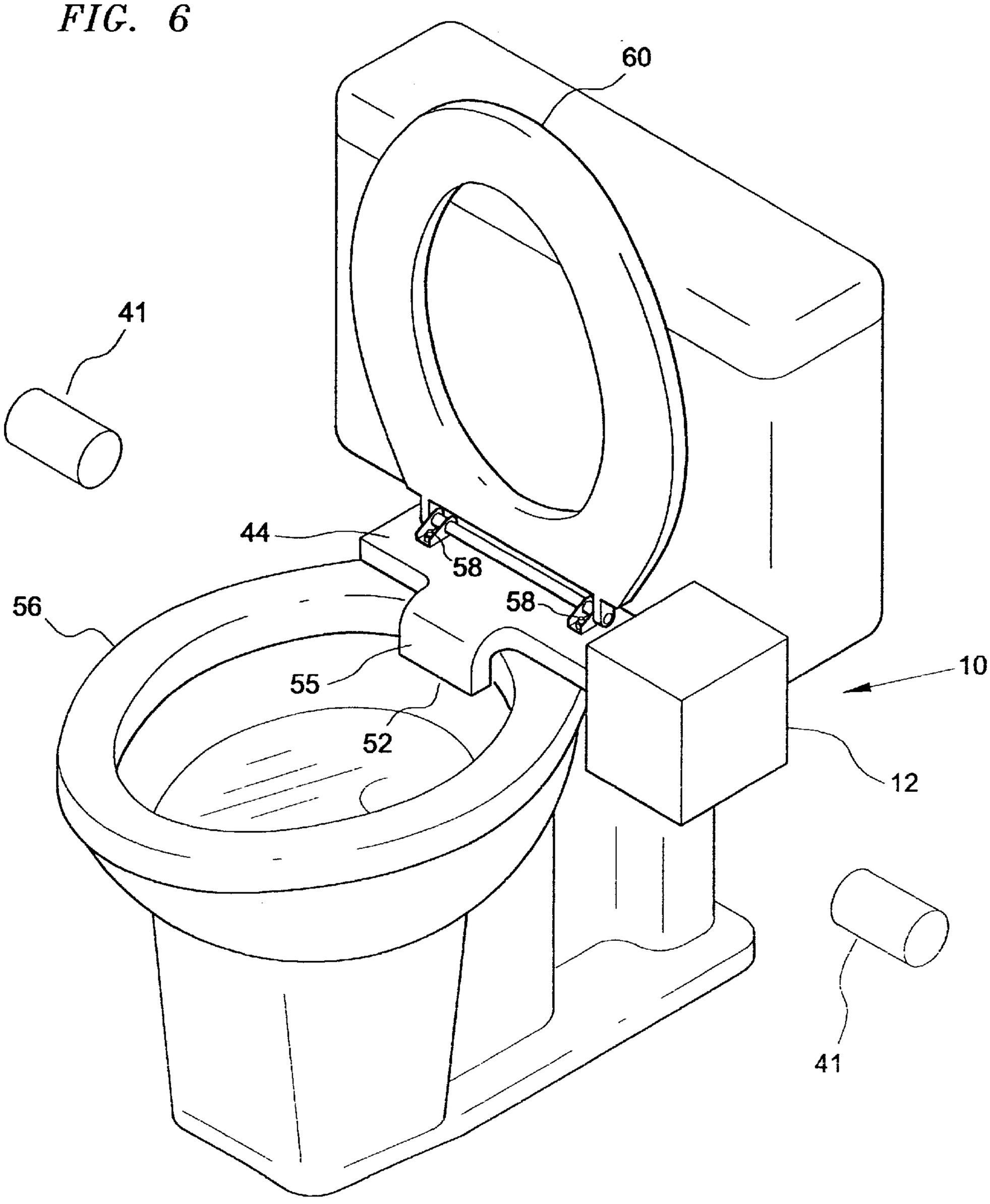
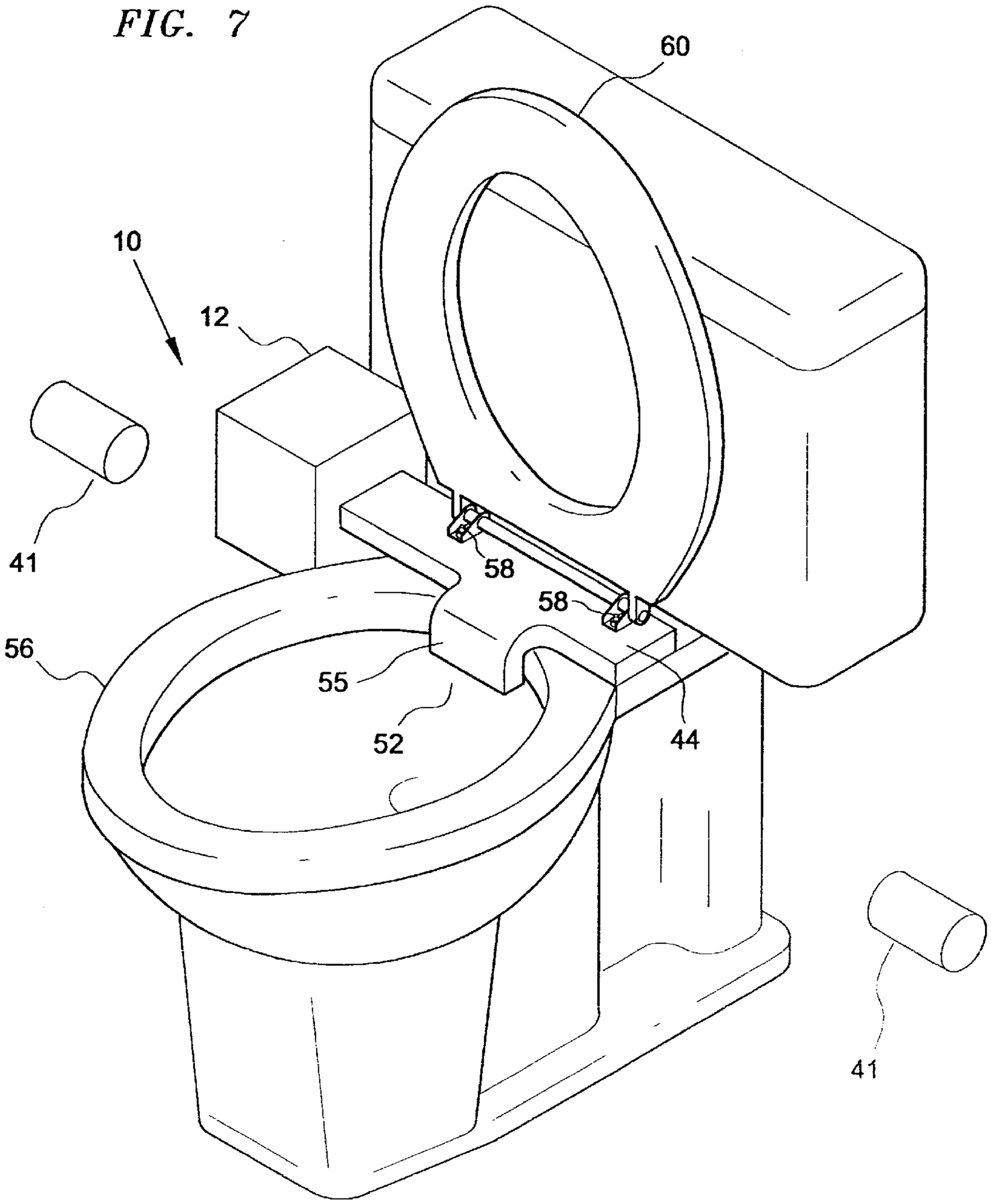


FIG. 7



TOILET BOWL VENTILATING APPARATUS

This application is a continuation-in-part of application Ser. No. 09/130,416, filed Aug. 6, 1998, now abandoned.

FIELD OF THE INVENTION

The present invention relates to a toilet bowl ventilating apparatus.

BACKGROUND OF THE INVENTION

Canadian patent 1,012,305 discloses a several embodiments of toilet that are modified to include in their construction a ventilating apparatus. The ventilating apparatus is intended to draw contaminated air and odours from the toilet bowl. Each embodiment includes a hollow toilet seat which serves as a conduit for drawing contaminated air from the toilet bowl. Two alternative mounting positions are illustrated for a blower which promotes the movement of air. One mounting position discloses a toilet tank which is modified by the addition of a partition to create a watertight compartment in which the blower is positioned. Another mounting position discloses a separate blower compartment positioned beneath the toilet tank. The problem with the ventilating apparatus disclosed in Canadian patent 1,012,305, is that it is not capable of being readily retrofit onto an existing toilet.

U.S. Pat. No. 5,488,741 (Hunnicutt Jr.) discloses a toilet bowl ventilating apparatus that consists of a mounting arm with a housing secured in cantilever fashion to the mounting arm. The Hunnicutt ventilating apparatus is more readily adaptable to an existing toilet by securing the mounting arm to toilet seat mounting bolts of a toilet bowl. When retrofitting existing toilets there are often space constraints encountered that require the housing of Hunnicutt to be positioned to one particular side of the toilet. This requires Hunnicutt to either maintain an inventory of both left-handed and right-handed model, or to restrict his sales to either left-handed or right-handed models.

SUMMARY OF THE INVENTION

What is required is a toilet bowl ventilating apparatus that has greater adaptability when retrofitting existing toilets.

According to the present invention there is provided a toilet bowl ventilating apparatus which includes a housing having an interior cavity forming an air flow channel. The air flow channel has an inlet and an outlet. A receptacle is provided for filter medium positioned across the air flow channel between the inlet and the outlet, such that air flowing from the inlet to the outlet must pass through filter medium positioned in the receptacle. A fan communicate with the air flow channel. A power supply is provided. A switch is provided for selectively supplying power from the power supply to the fan, whereby the fan moves air in the inlet, along the air flow channel through the filter medium and out the outlet. An elongate plinth-like mounting arm is provided having a first end and a second end. The first end is secured substantially symmetrically at a mid-point of the housing. The mounting arm has an air flow passage communicating with the inlet and extending from the first end toward the second end. The mounting arm has at least one bolt receiving aperture extending therethrough whereby the mounting arm is mounted to toilet seat mounting bolts of a toilet bowl. The mounting arm has an outwardly and downwardly extending elongated intake passage intersecting the air flow passage, such that the intake passage extends down into the toilet bowl. The intake passage is flexibly adjustable over 180 degrees to a selected orientation, thereby enabling the intake passage to change orientation depending upon whether the housing is positioned on the left side or the right side of the toilet bowl.

The toilet bowl ventilating apparatus, as described above, is readily mounted by means of the feed duct/mounting arm onto the toilet seat mounting bolts of virtually any style of toilet bowl. It is preferred that the power supply be in the form of a battery mounted in the housing with a low voltage battery charging unit periodically recharging the battery. Once the basic teachings is understood, additional features can be added to enhance the performance of the ventilating apparatus. One such additional feature is the provision of a receptacle for receiving fragrance. This receptacle is positioned along the air flow channel downstream of the filter medium. This enables air flowing through the air flow channel to be imbued with fragrance after filtration and prior to discharge back into the room. It is preferred that the filter medium be provided in a removable cartridge.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings, wherein:

FIG. **1** is a top plan view, in section, of a toilet bowl ventilating apparatus constructed in accordance with the teachings of the present invention.

FIG. **2** is a front elevation view, in section, of the toilet bowl ventilating apparatus illustrated in FIG. **1**.

FIG. **3** is a right side elevation view, in section, of the toilet bowl ventilating apparatus illustrated in FIG. **1**.

FIG. **4** is a left side elevation view, in section, of the toilet bowl ventilating apparatus illustrated in FIG. **1**.

FIG. **5** is a detailed perspective view of a filter cartridge removed from the toilet bowl ventilating apparatus illustrated in FIG. **1**.

FIG. **6** is a perspective view of the toilet bowl ventilating apparatus illustrated in FIG. **1** mounted onto a toilet bowl with the housing positioned on the right side.

FIG. **7** is a perspective view of the toilet bowl ventilating apparatus illustrated in FIG. **1** mounted onto a toilet bowl with the housing positioned on the left side.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment, a toilet bowl ventilating apparatus generally identified by reference numeral **10**, will now be described with reference to FIGS. **1** through **7**.

Referring to FIG. **1**, toilet bowl ventilating apparatus **10** includes a housing **12** having an interior cavity **14** forming an air flow channel **16**. Air flow channel **16** has an inlet **18** and an outlet **20**. A receptacle **22** for filter medium **24** is positioned across air flow channel **16** between inlet **18** and outlet **20**. Air flowing from inlet **18** to outlet **20**, as indicated by arrow **26**, must pass through filter medium **24** positioned in receptacle **22**. It is preferred that filter medium **24** be positioned in a removable filter cartridge **28** which is positioned in receptacle **22**. Referring to FIG. **5**, filter cartridge **28** has air permeable sidewalls **30** to confine filter medium **24**. There are various materials with known beneficial effects when used as a filter medium, such as activated carbon. Referring to FIG. **1**, a fan **32** which includes a miniature drive motor **34** communicates with air flow channel **16**. Although a larger industrial unit could be built using a direct

AC plug in connection, the version illustrated is a smaller domestic version that uses batteries. A battery **36** is mounted in housing **12** to supply power fan **32**. A low voltage alternating current to direct current battery charging unit **38** is also mounted in housing **12**. Battery charging unit **38** is coupled with battery **36** and serves to charge battery **36**, as required. Referring to FIG. **2**, a switch is provided for selectively supplying power from battery **36** to fan **32**. Switch can either be a push button style switch, such as indicated by reference numeral **40** or can be triggered by infrared sensors **41**, as illustrated in FIGS. **6** and **7**. When infrared sensors **41** are used fan **32** is activated as soon as the presence of a person is sensed and the fan continues to operate for 30 seconds after the presence of a person is no longer sensed. The angle at which sensor **41** is positioned has an effect on operation. When the angle is less than 5 degrees, there is a danger that the sensor will be triggered by the seat. When the angle is greater than 30 degrees there is a danger that the sensor will miss detecting the presence of a child. The distance the sensor projects is also of importance. If sensor projects for too great a distance, there is a danger that operation of fan **32** will be triggered by persons walking past the toilet. It has been found that sensors **41** do not need to be constantly on; energy savings can be obtained if sensors **41** are "pulsed" rather than on continuously. It is preferred that two sensors **41** be provided. One of sensors **41** is set to the correct angle when positioned to the left of the toilet bowl and the other of sensors **41** is set to the correct angle when positioned to the right of the toilet bowl. A receptacle **42** is provided for receiving fragrance. Receptacle **42** is positioned along air flow channel **16** downstream of filter medium **24**. Referring to FIG. **1**, an elongate plinth-like feed duct/mounting arm **44** is provided having a first end **46** and a second end **48**. First end **46** is secured to housing **12**. Feed duct/mounting arm **44** has an air flow passage **50** communicating with inlet **18** and extending from first end **46** toward second end **48**. Feed duct/mounting arm **44** has an elongated intake passage **52** which intersects air flow passage **50**. Feed duct/mounting arm **44** has two bolt receiving apertures **54** extending therethrough. Referring to FIG. **4**, elongated intake passage **52** has a downwardly extending portion **55**. It is preferred that housing **12** and feed duct/mounting arm **44** are a single body molded from polymer plastic.

The use and operation of toilet bowl ventilating apparatus **10** will now be described with reference to FIGS. **1** through **7**. Referring to FIG. **6**, there is illustrated a toilet bowl **56** which has two upwardly projecting mounting bolts **58** used to secure a toilet seat **60** onto toilet bowl **56**. In order to mount toilet bowl ventilating apparatus **10** onto toilet bowl **56**, toilet seat **60** is temporarily removed. Feed duct/mounting arm **44** is then mounted onto toilet bowl **56** by extending mounting bolts **58** through bolt receiving apertures **54**. Toilet seat **60** is then reinstalled over top of feed duct/mounting arm **44**. When installed, downwardly extending portion **55** of intake passage **52** extends down into toilet bowl **56**. Housing **12** hangs from mounting arm **44** in a cantilever fashion. Referring to FIGS. **1** and **2**, fan **32** can be activated in the absence of a person sitting on toilet seat **60** by pushing button switch **40** to commence a timer controlled activation cycle. Referring to FIGS. **6** and **7**, when a person sits on toilet seat **60**, fan **32** is triggered by infrared sensors **41** detecting the presence of the person positioned on toilet seat **60**. Fan **32** will operate as long as infrared sensors **41** detect the position of the person, and for a 30 second timed duration after the person is no longer sensed. As long as fan **32** remains in operation, air is drawn by fan in through intake

passage **52** and along air flow passage **50** to inlet **18**. Air passes through inlet **18**, along air flow channel **16** through filter cartridge **28** and out through outlet **20**. Due to the positioning of fragrance receptacle **42**, air passing along air flow channel **16** and out outlet **20** is imbued with fragrance. Whenever the charge in battery **36**, which powers fan **32**, falls below a preset level, battery charging unit **38** is activated to recharge battery **36**. Battery charging unit **38** can be plugged into a household power receptacle with a normal AC/DC adaptor.

Referring to FIG. **7**, it is preferred that first end **46** of feed duct/mounting arm **44** be secured substantially symmetrically at a mid-point of housing **12**. This is to facilitate housing being positionable on either the left side or the right side of toilet bowl **56**. It is also preferred that extending portion **55** of intake passage **52** be flexibly adjustable over 180 degrees to a selected orientation. This enables extending portion **55** of intake passage **52** to change orientation to extend down into toilet bowl **56**, regardless of whether housing **12** is positioned to the left side or the right side of toilet bowl **56**.

It will be apparent to one skilled in the art that modifications may be made to the illustrated embodiment without departing from the spirit and scope of the invention as hereinafter defined in the claims.

We claim:

1. A toilet bowl ventilating apparatus, including:

a housing having an interior cavity forming an air flow channel, the air flow channel having an inlet and an outlet;

a receptacle for filter medium positioned across the air flow channel between the inlet and the outlet, such that air flowing from the inlet to the outlet must pass through filter medium positioned in the receptacle;

a fan communicating with the air flow channel;

a power supply;

a switch for selectively supplying power from the power supply to the fan, whereby the fan moves air in the inlet, along the air flow channel through the filter medium and out the outlet; and

an elongate plinth-like mounting arm having a first end and a second end, the first end being secured at a mid-point of the housing, the mounting arm having an air flow passage communicating with the inlet and extending from the first end toward the second end, the mounting arm having at least one bolt receiving aperture extending therethrough whereby the mounting arm is mountable to toilet seat mounting bolts of a toilet bowl, the mounting arm having an outwardly and downwardly extending elongated intake passage intersecting the air flow passage, such that the intake passage extends down into the toilet bowl, the intake passage being flexibly adjustable over 180 degrees to a selected orientation, thereby enabling the intake passage to change orientation depending upon whether the housing is positioned on the left side or the right side of the toilet bowl.

2. The toilet bowl ventilating apparatus as defined in claim **1**, wherein a receptacle for receiving fragrance is positioned along the air flow channel downstream of the filter medium.

3. The toilet bowl ventilating apparatus as defined in claim **1**, wherein the power supply is a battery mounted in the housing together with a low voltage alternating current to direct current battery charging unit.

4. The toilet bowl ventilating apparatus as defined in claim **1**, wherein the filter medium is disposed in a removable cartridge.

5. The toilet bowl ventilating apparatus as defined in claim **1**, wherein the switch includes at least one proximity sensor, whereby power is selectively supplied from the power supply to the fan when a person is detected by the at least one proximity sensor.

6. The toilet bowl ventilating apparatus as defined in claim **5**, wherein two proximity sensors are provided, one of the two proximity sensors adapted to detect the presence of a person when the housing is positioned on the left side of the toilet bowl and another of the two proximity sensors adapted to detect the presence of a person when the housing is positioned on the right side of the toilet bowl.

7. The toilet bowl ventilating apparatus as defined in claim **1**, wherein the housing and mounting arm form a one piece unit molded from polymer plastic.

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